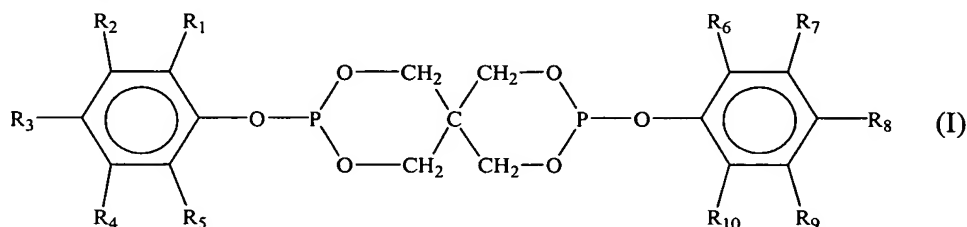


THAT WHICH IS CLAIMED IS:

1. A composition formed by combining components comprising:

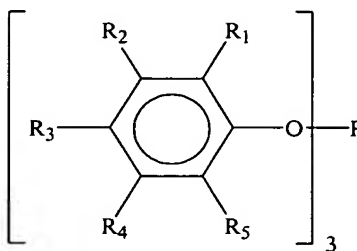
- a) a polyolefin;
- b) at least one high activity phosphite comprising an arylalkyl diphosphite

5 having a formula,



wherein R₁, R₂, R₃, R₄, R₅, R₆, R₇, R₈, R₉, and R₁₀ can be the same or different and are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, and/or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

c) at least one hydrolytically stable phosphite comprising a triarylphosphite having a formula:



wherein R₁, R₂, R₃, R₄, and R₅, are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, and/or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

- d) optionally, a primary polymer stabilizer;
- e) optionally, an acid scavenger;
- f) optionally, an organic base, Lewis base, or aliphatic amine;
- g) optionally, water; and
- h) optionally, a hindered amine,

wherein the at least one high activity phosphite and the at least one hydrolytically stable phosphite are present in the composition in respective amounts sufficient to raise the Phillips Color Number (PE #) with processing to a value greater than the PE # of a composition formed by combining like amounts of the polyolefin, the high activity phosphate, a hindered phenol, water, and an acid scavenger.

2. The composition according to Claim 1, further comprising an ultraviolet absorber or light stabilizer.

3. The composition according to Claim 2, wherein the ultraviolet absorber or light stabilizer is a 2-(2'-Hydroxyphenyl)-benzotriazole; a 2-Hydroxybenzophenone; an ester of substituted and unsubstituted benzoic acids; an acrylate; a nickel compound; a hindered amine; an oxalic acid diamide; or any mixture thereof.

4. The composition according to Claim 3, wherein the hindered amines are bis-(2,2,6,6-tetramethylpiperidyl)-sebacate; bis-(1,2,2,6,6-pentamethylpiperidyl)-sebacate; n-butyl-3,5-di-t-butyl-4-hydroxybenzyl malonic acid; bis-(1,2,2,6,6-pentamethylpiperidyl)ester; condensation product of 1-hydroxyethyl-2,2,6,6-tetramethyl-4-hydroxy-piperidine and succinic acid; condensation product of N,N'-(2,2,6,6-tetramethylpiperidyl)-hexamethyldiamine and 4-t-octylamino-2,6-dichloro-1,3,5-s-triazine; tris-(2,2,6,6-tetramethylpiperidyl)-nitrilotriacetate; tetrakis-(2,2,6,6-tetramethyl-4-piperidyl)-1,2,3,5-butane-tetracarboxylic acid; 1,1'-(1,2-ethanediyl)-bis-(3,3,5,5-tetramethylpiperazinone); di-(1-hydroxy-2,2,6,6-tetramethylpiperidin-4-yl)sebacate; 1-hydroxy-2,2,6,6-tetramethyl-4-benzoxypiperidine; 1-hydroxy-2,2,6,6-tetramethyl-4(3,5-di-t-butyl-4-hydroxyhydrocinnamoyloxy)piperidine; N-(1-hydroxy-2,2,6,6-tetramethylpiperidin-4-yl)- ϵ -caprolactam, or any mixture thereof.

5. The composition according to Claim 1, wherein the polyolefin is a homopolymer of one mono-1-olefin having from about 2 to about 10 carbon atoms per molecule or a copolymer of at least 2 different mono-1-olefins having about 2 to about 10 carbon atoms per molecule.

6. The composition according to Claim 1, wherein the polyolefin is an ethylene homopolymer.

7. The composition according to Claim 1, wherein the polyolefin is a copolymer of ethylene and a higher alpha-olefin comonomer having from about 3 to about 16 carbon atoms per molecule.

8. The composition according to Claim 1, wherein the comonomer is present in the polyolefin within a range of about 1 to about 20 weight percent comonomer based on the total weight of the copolymer.

9. The composition according to Claim 1, wherein the polyolefin is prepared in the presence of an inorganic oxide supported chromium oxide catalyst system.

10. The composition according to Claim 6, wherein the inorganic oxide of the inorganic oxide supported chromium catalyst system is a silica-titania support.

11. The composition according to Claim 7, wherein the polyolefin contains from about 1 mg/kg to about 10 mg/kg, based on the mass of the neat polyolefin, titania catalyst residue calculated as titanium.

12. The composition according to Claim 1, wherein the polyolefin is prepared in the presence of a transition metal halide catalyst system.

13. The composition according to Claim 1, wherein the polyolefin is prepared in the presence of a catalyst system comprising a metallocene.

14. The composition according to Claim 1, wherein R_2 , R_4 , R_5 , R_7 , R_9 , and R_{10} in the high activity phosphite are hydrogen and R_2 , R_3 , R_6 , and R_8 are mixed aliphatic and aromatic organic radicals having from about 1 to about 20 carbon atoms per radical.

15. The composition according to Claim 1, wherein the high activity phosphite is bis(2,4-dicumylphenyl)pentaerythritol disphosphite.

16. The composition according to Claim 1, wherein the high activity phosphite is bis(2,4-di-tert-butylphenyl)pentaerythritol disphosphite.

17. The composition according to Claim 1, wherein R_2 , R_4 , R_5 , R_7 , R_9 , and R_{10} in the second arylalkyl diphosphite are hydrogen and R_1 , R_3 , R_6 , and R_8 are selected from straight-chained and branched organic radicals having from about 1 to about 20 carbon atoms per radical.

18. The composition according to Claim 1, wherein the another arylalkyl diphosphite is bis(2,4-di-tert-butylphenyl)pentaerythritol diphosphite.

19. The composition according to Claim 1, wherein the another arylalkyl diphosphite is bis(2,4-dicumylphenyl)pentaerythritol diphosphite.

5 20. The composition according to Claim 1, wherein R_2 , R_4 , and R_5 in the triarylphosphite are hydrogen and R_1 and R_3 are selected from straight-chained and branched organic radicals having from about 1 to about 20 carbon atoms per radical.

21. The composition according to Claim 1, wherein the triarylphosphite is tris(2,4-di-tert-butylphenyl) phosphite.

10 22. The composition according to Claim 1, wherein the high activity phosphite and the hydrolytically stable phosphite are present in a total phosphite amount within a range of about 50 mg/kg to about 20,000 mg/kg based on the mass of the neat polyolefin.

15 23. The composition according to Claim 1, wherein the high activity phosphite and the hydrolytically stable phosphite are present in a total phosphite amount within a range of 100 mg/kg to 1,500 mg/kg based on the mass of the neat polyolefin.

24. The composition according to Claim 1, wherein the high activity phosphite and the hydrolytically stable phosphite are present in a total phosphite amount within a range of 100 mg/kg to 1,200 mg/kg based on the mass of the neat polyolefin.

20 25. The composition according to Claim 15 wherein the hydrolytically stable phosphite is present in an amount within a range of about 2% to about 90% by weight of the total amount of the high activity phosphite and the hydrolytically stable phosphite added to the neat polyolefin.

25 26. The composition according to Claim 1, wherein the hydrolytically stable phosphite is present in an amount within a range of about 10% to about 60% by weight of the total amount of the high activity phosphite and the hydrolytically stable phosphite added to the neat polyolefin.

30 27. The composition according to Claim 1, wherein the primary polymer stabilizer is a hindered phenol selected from monophenols, bisphenols, thiobisphenols, polyphenols, hydroxybenzyl aromates, amides of (1-(3,5-ditert-butyl-4-

hydroxyphenyl)-propionic acid, esters of (3-(3,5-di-tert-butyl-4hydroxyphenyl)-propionic acid with mono- or polyvalent alcohols, spiro compounds, or any mixture thereof.

28. The composition according to Claim 1, wherein the primary polymer stabilizer is a hindered phenol selected from tetrakis(methylene 3(3,5-di-t-butyl-4-hydroxyphenyl)propionate) methane; 1,3,5-tri-(3,5-di-tertbutyl-4-hydroxybenzyl)-2,4,6-trimethylbenzene; a-(3,5-di-tert-butyl-4hydroxyphenyl)-propionic acid-n-octadecyl ester; 2,6-di-tert-butyl-4-methylphenol; 3,9-bis-[1,1-dimethyl-2-(3,5-di-tert-butyl-4-hydroxy-phenyl)-ethyl]2,4,8,10-tetraoxaspiro-[5,5]-undecane; or any mixture thereof.

29. The composition according to Claim 1, wherein the primary polymer stabilizer is tetrakis[methylene (3,5-di-tert-butyl-4-hydroxyhydrocinnamate)]methane.

30. The composition according to Claim 1, wherein the primary polymer stabilizer is present in an amount less than about 5000 mg/kg based on the mass of the neat polyolefin.

31. The composition according to Claim 1, wherein the primary polymer stabilizer is present in an amount within a range of about 50 mg/kg to about 2500 mg/kg based on the mass of the neat polyolefin.

32. The composition according to Claim 1, wherein water is present in an amount up to about 5000 mg/kg based on the mass of the neat polyolefin.

33. The composition matter according to Claim 1, wherein water is present in an amount up to 1000 mg/kg based on the mass of the neat polyolefin.

34. The composition according to Claim 1, wherein the water has a pH within a range of about 4 to about 10.

35. The composition according to Claim 1, wherein the water has a pH within a range of about 6 to about 8.

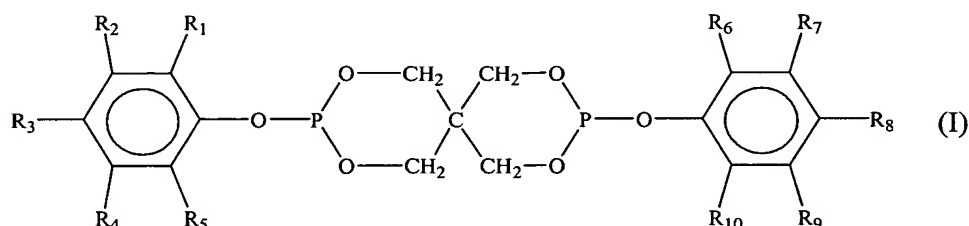
36. The composition according to Claim 4, wherein the hindered amine is present in an amount within a range of about 50 mg/kg to about 5000 mg/kg based on the mass of the neat polyolefin.

37. The composition according to Claim 1, wherein the aliphatic amine is triisopropanolamine and triisopropanolamine is present in an amount within a range of about 0.25 mg/kg to about 100 mg/kg based on the mass of the neat polyolefin.

38. A composition formed by combining components comprising:

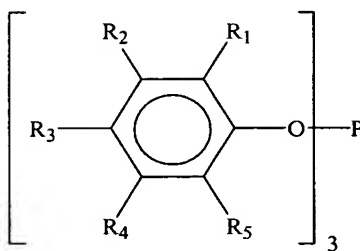
a) a polyolefin selected from homopolymers of one mono-1-olefin having from about 2 to about 10 carbon atoms per molecule or copolymers of at least 2 different mono-1-olefins having about 2 to about 10 carbon atoms per molecule;

b) a high activity phosphite comprising an arylalkyl diphosphite having a formula,



wherein R_2 , R_4 , R_5 , R_7 , R_9 , and R_{10} are hydrogen and R_1 , R_3 , R_6 , and R_8 are mixed aliphatic and aromatic organic radicals having from about 1 to about 20 carbon atoms per radical;

c) a hydrolytically stable phosphite comprising a triarylphosphite having a formula,



wherein R_2 , R_4 , and R_5 in the triarylphosphite are hydrogen and R_1 and R_3 are selected from straight-chained or branched organic radicals having from about 1 to about 20 carbon atoms per radical, the high activity phosphite and the hydrolytically stable phosphite being present in a total phosphite amount within a range of about 50 mg/kg to about 20,000 mg/kg based on the mass of the neat polyolefin;

d) optionally, another arylalkyl diphosphite of formula (I), wherein R_2 , R_4 , R_5 , R_7 , R_9 , and R_{10} in the another arylalkyl diphosphite are hydrogen and R_1 , R_3 , R_6 , and

R_8 are selected from straight-chained or branched organic radicals having from about 1 to about 20 carbon atoms per radical;

e) optionally, a hindered phenol in an amount within a range of about 50 mg/kg to about 5000 mg/kg based on the mass of the neat polyolefin;

5 f) optionally, water in an amount within a range of 1 mg/kg to about 5000 mg/kg based on the mass of the neat polyolefin;

g) optionally, a hindered amine in an amount within a range of about 50 mg/kg to about 5,000 mg/kg based on the mass of the neat polyolefin; and

10 h) optionally, triisopropanolamine in an amount within a range of about 0.25 mg/kg to about 100 mg/kg based on the mass of the neat polyolefin; and

i) optionally, a acid scavenger in an amount within a range of about 1.25 mg/kg to about 500 mg/kg based on the mass of the neat polyolefin.

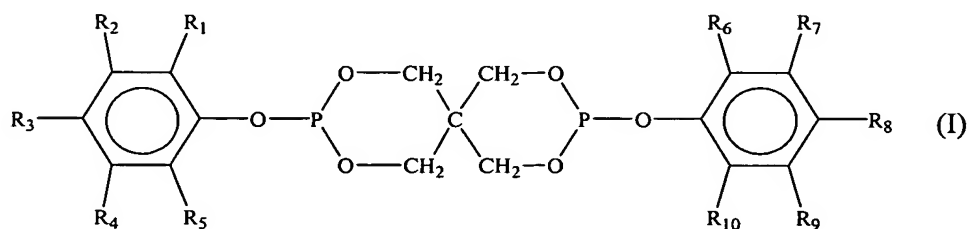
39. The composition according to Claim 38, wherein the high activity phosphite and the hydrolytically stable phosphite are present in a total phosphite amount
15 within a range of 1 mg/kg to 1,500 mg/kg based on the mass of the neat polyolefin.

40. The composition according to Claim 38, wherein the high activity phosphite and the hydrolytically stable phosphite are present in a total phosphite amount within a range of 1 mg/kg to 1,200 mg/kg based on the mass of the neat polyolefin

41. A process comprising blending:

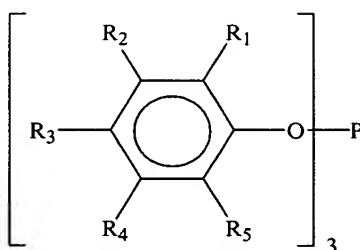
20 a) a polyolefin;

b) a high activity phosphite comprising an arylalkyl diphosphite having a formula,



wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} can be the same or different and are selected from hydrogen or straight chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

- 5 c) a hydrolytically stable phosphite comprising a triarylphosphite having a formula,



- 10 wherein R_1 , R_2 , R_3 , R_4 , and R_5 are selected from hydrogen or straight chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

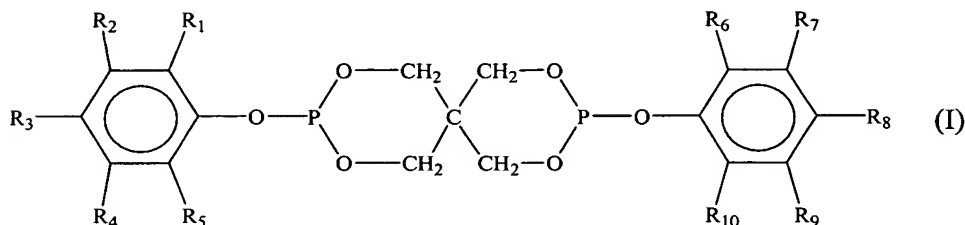
- d) optionally, another arylalkyl diphosphite of formula (I), wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} can be the same or different and are selected from
15 hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, and/or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical, which is different from the high activity phosphite;

- e) optionally, a hindered phenol;
f) optionally, water;
20 g) optionally, triisopropanolamine;
h) optionally, an acid scavenger; and
i) optionally, a hindered amine.

42. A process according to Claim 41, wherein the blending procedure is selected from mixing, pelletizing, extruding, and mixtures thereof.

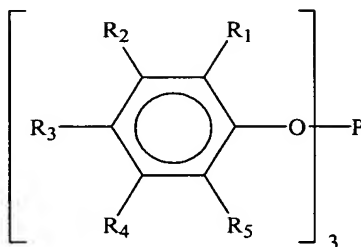
- 25 43. A process to improve the melt stability upon recycle of a polyolefin comprising blending:

- a) a polyolefin;
- b) a high activity phosphite comprising an arylalkyl diphosphite having a formula,



wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} can be the same or different and are selected from the group consisting of hydrogen and straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, and/or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

- c) a hydrolytically stable phosphite comprising a triarylphosphite having a formula,



wherein R_1 , R_2 , R_3 , R_4 , and R_5 are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

- d) optionally, another arylalkyl diphosphite of formula (I), wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} can be the same or different and are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical, which is different from the high activity phosphite;

- e) optionally, a hindered amine in an amount within the range of about 50 mg/kg to about 5,000 mg/kg based on the mass of the neat polyolefin;

f) optionally, triisopropanolamine in an amount within the range of about 0.5 mg/kg to about 50 mg/kg based on the mass of the neat polyolefin;

g) optionally, a hindered phenol;

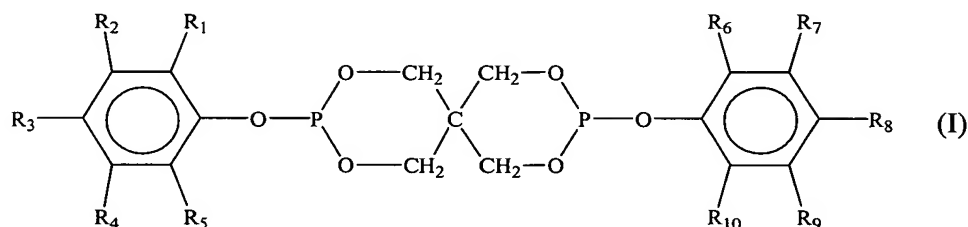
h) optionally, water; and

5 i) optionally, an acid scavenger.

44. An article of manufacture prepared from a polymer produced by a process comprising blending:

a) a polyolefin;

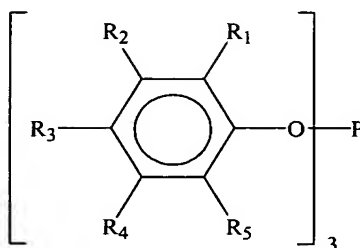
10 b) a high activity phosphite comprising an arylalkyl diposphite having a formula,



15 wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} can be the same or different and are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

c) a hydrolytically stable phosphite comprising a triarylphosphite having a formula,

20



wherein R^1 , R^2 , R^3 , R^4 , and R^5 are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic,

and/or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

d) optionally, a second arylalkyl diphosphite of formula (I), wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} can be the same or different and are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical, which is different from the high activity phosphite;

e) optionally, a hindered amine in an amount within a range of about 50 mg/kg to about 5,000 mg/kg based on the mass of the neat polyolefin;

f) optionally, triisopropanolamine in an amount within a range of about 0.25 mg/kg to about 100 mg/kg based on the mass of the neat polyolefin;

g) optionally, a hindered phenol;

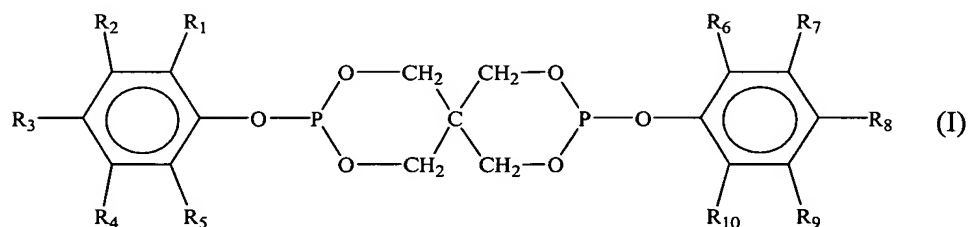
h) optionally, water; and

i) optionally, an acid scavenger.

45. A process to improve the Phillips color number of whiteness index of a polyolefin comprising blending:

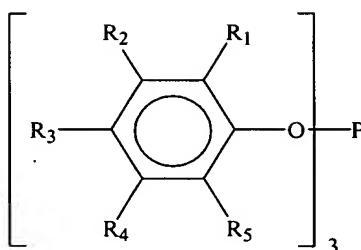
a) a polyolefin;

b) a high activity phosphite comprising an arylalkyl diphosphite having a formula,



wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} can be the same or different and are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

c) a hydrolytically stable phosphite comprising a triarylphosphite having a formula,



5

wherein R_1 , R_2 , R_3 , R_4 , and R_5 are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical;

d) optionally, another arylalkyl diphosphite of formula (I), wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} can be the same or different and are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical, which is different from the high activity phosphite;

e) optionally, a hindered amine in an amount within a range of about 50 mg/kg to about 5,000 mg/kg based on the mass of the neat polyolefin;

f) optionally, triisopropanol amine in an amount within a range of about 0.25 mg/kg to about 100 mg/kg based on the mass of the neat polyolefin.

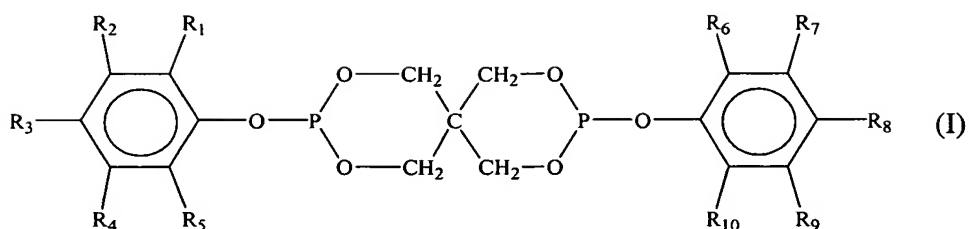
g) optionally, a hindered phenol;

h) optionally, water; and

i) optionally, an acid scavenger.

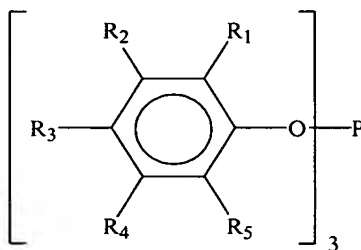
46. A kit comprising:

a) at least one high activity phosphite comprising an arylalkyl diphosphite having a formula,



wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} can be the same or different and are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, and/or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical; and

b) at least one hydrolytically stable phosphite comprising a triarylphosphite having a formula:



wherein R_1 , R_2 , R_3 , R_4 , and R_5 , are selected from hydrogen or straight-chained or branched, cyclic or acyclic, aromatic or aliphatic, and mixed aliphatic, aromatic, and/or cycloaliphatic organic radicals having from about 1 to about 20 carbon atoms per radical.

47. The kit according to Claim 46, wherein the at least one high activity phosphite and the at least one hydrolytically stable phosphite are in a mixture with one another.

48. The kit according to Claim 46, wherein the at least one high activity phosphite and the at least one hydrolytically stable phosphite are separate from one another.

49. The kit according to Claim 48, wherein the at least one high activity phosphite comprises a plurality of high activity phosphites and each such phosphite is separate from one another.

50. The kit according to Claim 48, wherein the at least one hydrolytically stable phosphite comprises a plurality of hydrolytically stable phosphites and each such phosphite is separate from one another.